Author index

April R.
Goodbye, Moon! 130
First pick your planet 216
Short life on hellish planet 454

Ashworth S.
Battle between old and new 252

Cain J.R.
Moon dust - a danger to lunar explorers 60

Coppinger R.
The reality of where we are - can space save the planet? 116
Boeing and Bigelow work on future plans 326
Russia's Soyuz replacement 327
China's new Long March booster 328
Russian company leaves Harwell 328
First private space station 372
Orion 1 Prime launcher selection 367
Space Station to get Node 4 367
UK Space Agency awaits funding review 406
Europe to decide on ATV future direction 445
US military plans reusable winged rocket test 446
Europe evaluates plans for future launcher 447
India pushes human spaceflight 448
Bigelow signs space station deals 449

Corneille P.
Six years of MER operations on Mars 20
More Wisdom with WISE 48
Geologists' delight at asteroid samples 290
Rosetta's flyby of asteroid 21 Lutetia 334
Half-way to Pluto 420

Corneille P., Simpson C. and Kremer K.
A new eye on the Sun 134

Cunningham W.
Losing the will to explore space 196

Cutts S.
Building bridges between worlds of art and science 392

Dawson M. and Simpson C.
Space Station Chronology 96

Day D.
Tough little spinner 66
Black antennas 105
A paler shade of black 190
Peering into PANdora's box 304
Taste of space in Windy City 390
Journey to a red moon 424

Easton R.
The genesis of GPS 68

Green A.
Journey into Space 74
Charm and modesty of Apollo astronauts 274

Guillemette R.G.
Pad Leader and American space legend 349

Horsford C.
The origins of space law 110

Ivanovich G.
Cosmonauts commemorated 466

Kidger N.
Space Station Chronology 14

Kremer K.
Tranquility' handed over to NASA 6
Atlantis amkes crucial ISS delivery 10
One extra Shuttle flight for NASA? 50
Shuttle delivers spares stash to ISS 52
ISS crew down to two after Soyuz undocks 58
New tower takes shape at KSC 94
Countdown for *Discovery* mission to Space Station 171
Orion could be ready by 2013 175
Obama tweaks radical NASA goals 211
Russian science beauty unveiled 214
Space Shuttle exhaust creates exotic clouds 220
WORF and Klingons occupy Space Station 226
Test version of Orion crew capsule takes shape 245
Emotions ride high for last launch of *Atlantis* 249
Atlantis' ;ast blast with Russian beauty 298
Last Shuttle boosters arrive at KSC 303
Test capsule is joined up 337
Artificial' funding crisis aims to circumvent US Congress 338
3D Shuttle tribute graces Launch Control Center 344
Orion Pathfinder moves to test phase 366
SpaceX prepares for Dragon flight 408
Discovery readied for final flight 414
Plan for crewed Asteroid mission 426
Discovery carries 'extra' room 450
End of road for giant fuel tank 456
Kennedy landscape to change forever 458
Space Shuttle artwork legacy 460

Kremer K., Simpson C. and van de Haar G.
New window on the world 139

Kremer K. and van de Haar G.
Disovery's penultimate voyage 219

Lawrie A.
Anniversary of Saturn rocekt's first test firing 262
Identifying Saturn F-1 engines after 40 years - Part 1 308
Identifying Saturn F-1 engines after 40 years - Part 2 346

MacTaggart K.
Cosmonaut takes chair at UN Space Committee 208

McDowell J.
Satellite Digest 78, 92, 128, 170, 210, 248, 278

McNicholas D.
Space communications down-under 100

Mulheirn R.
Lunar destiny 186

Powell J.
ELVIS has left the launch pad 151
Iconic images capture Cape Canaveral origins 380

Richards G.
Satellite Digest 288, 332, 370, 412

Robertson D.F.
Workers grounded without pay 300
Last chance to view a Space Shuttle launch 356

Sanibel M.
Flawed logic of US Space Shuttle 178

Schuminszky N.
Hungry for Space - Simonyi in orbit 26
Politics of the first socialist spacefarers 228

Simpson C.
Mission to test concepts of harvesting solar power 86
SpaceX awaits clearance to launch Falcon 9 129
Bolden carves out commercial future for KSC 132
Space Station Chronology 147
Liftoff for British space agency 167
Boom time for UK space business 325
US space policy under spotlight 378

Spall N.
British ESA astronaut Tim Peake in training 89
British election will set policy course 91
Space biomedicine - a UK perspective 173
Training to the peak of perfection 250
Systems review propels Skylon into spotlight 405

Spiteri G.
Space Station Chronology 182, 224, 257, 295, 340, 383, 417, 463

Stevenson R.
Missles that changed history 267

Stewart M. and A.
How giving up Skylab cost the Earth 434

Quine T.
Women included in new taikonau group 165

van de Haar G. and Simpson C.
Simulated journey to the red planet 172

van de Haar G.
First Air Force spaceplane launches into blackout 209
Launch of new high tech spec military satellite 369
Extending military capabilities 375

Walmsley W.
Growing food in space 388

Zheleznyakov A.
Forgotten space dogs 264

Subject index

A
ABMA 262
ACV 327
AEHF 369
Aero Sekur 286, 388
Afriye, Adam 91
AFSCN 108
Agrospace 388
Aleksandrov 228
Alpha 266
Alpha Magnetic Spectrometer 287
Ammonia hoses 142, 148
AOMC 262
Apollo astronauts 274
Apollo programme 61, 351
Apollo 1 351
Apollo 8 308, 346
Apollo 10 346
Apollo 11 185, 351, 426
Apollo 13 352, 390
Apollo 15 311
Apollo 16 310
Apollo 18 347
Apollo moon landings 100
Apollo-Soyuz 352, 383
Ares 1 51, 94, 133, 250, 303
Ariane 5 87, 247, 369, 411, 447
Arianespace 247, 369, 411
Arktika (Arctic) satellites 413
ARPA 262
Ashley, Robert 215
Asteroids 87, 290, 378, 422
Asteroid 21 Lutetia 334
Asteroid mission 290, 426
Asteroid Sample Return 290, 426
Astronauts
Aldrin, Buzz 350
Anderson, Clay 171, 219, 225
Antonelli, Tony 295, 298, 330
Armstrong, Neil 103, 205, 212, 253, 350
Behnken, Robert 139, 182
Bobko, Karol J 190
Bolden, Charles F 8, 52, 130, 176, 205, 213, 286, 325,338, 374, 378, 406
Bowen, Steven 295, 298, 330
Bresnik, Randy 52, 97
Caldwell Dyson, Tracy 47, 221, 224, 257, 295, 298, 340, 383, 417
Cernan, Gene 212, 253, 350
Chaffee, Roger 351
Chamitoff, Gregory 96
Chilton, Kevin 377
Coleman, Cady 341, 385
Collins, Mike 352
Conrad, Pete 60, 350
Creamer, T J 59, 96, 144, 147, 182, 224, 249, 257, 295, 298, 418

Author index

April R.
Goodbye, Moon! 130
First pick your planet 216
Short life on hellish planet 454

Ashworth S.
Battle between old and new 252

Cain J.R.
Moon dust - a danger to lunar explorers 60

Coppinger R.
The reality of where we are - can space save the planet? 116
Boeing and Bigelow work on future plans 326
Russia's Soyuz replacement 327
China's new Long March booster 328
Russian company leaves Harwell 328
First private space station 372
Orion 1 Prime launcher selection 367
Space Station to get Node 4 367
UK Space Agency awaits funding review 406
Europe to decide on ATV future direction 445
US military plans reusable winged rocket test 446
Europe evaluates plans for future launcher 447
India pushes human spaceflight 448
Bigelow signs space station deals 449

Corneille P.
Six years of MER operations on Mars 20
More Wisdom with WISE 48
Geologists' delight at asteroid samples 290
Rosetta's flyby of asteroid 21 Lutetia 334
Half-way to Pluto 420

Corneille P., Simpson C. and Kremer K.
A new eye on the Sun 134

Cunningham W.
Losing the will to explore space 196

Cutts S.
Building bridges between worlds of art and science 392

Dawson M. and Simpson C.
Space Station Chronology 96

Day D.
Tough little spinner 66
Black antennas 105
A paler shade of black 190
Peering into PANdora's box 304
Taste of space in Windy City 390
Journey to a red moon 424

Easton R.
The genesis of GPS 68

Green A.
Journey into Space 74
Charm and modesty of Apollo astronauts 274

Guillemette R.G.
Pad Leader and American space legend 349

Horsford C.
The origins of space law 110

Ivanovich G.
Cosmonauts commemorated 466

Kidger N.
Space Station Chronology 14

Kremer K.
Tranquility' handed over to NASA 6
Atlantis amkes crucial ISS delivery 10
One extra Shuttle flight for NASA? 50
Shuttle delivers spares stash to ISS 52
ISS crew down to two after Soyuz undocks 58
New tower takes shape at KSC 94
Countdown for *Discovery* mission to Space Station 171
Orion could be ready by 2013 175
Obama tweaks radical NASA goals 211
Russian science beauty unveiled 214
Space Shuttle exhaust creates exotic clouds 220
WORF and Klingons occupy Space Station 226
Test version of Orion crew capsule takes shape 245
Emotions ride high for last launch of *Atlantis* 249
Atlantis' ;ast blast with Russian beauty 298
Last Shuttle boosters arrive at KSC 303
Test capsule is joined up 337
Artificial' funding crisis aims to circumvent US Congress 338
3D Shuttle tribute graces Launch Control Center 344
Orion Pathfinder moves to test phase 366
SpaceX prepares for Dragon flight 408
Discovery readied for final flight 414
Plan for crewed Asteroid mission 426
Discovery carries 'extra' room 450
End of road for giant fuel tank 456
Kennedy landscape to change forever 458
Space Shuttle artwork legacy 460

Kremer K., Simpson C. and van de Haar G.
New window on the world 139

Kremer K. and van de Haar G.
Disovery's penultimate voyage 219

Lawrie A.
Anniversary of Saturn rocekt's first test firing 262
Identifying Saturn F-1 engines after 40 years - Part 1 308
Identifying Saturn F-1 engines after 40 years - Part 2 346

MacTaggart K.
Cosmonaut takes chair at UN Space Committee 208

McDowell J.
Satellite Digest 78, 92, 128, 170, 210, 248, 278

McNicholas D.
Space communications down-under 100

Mulheirn R.
Lunar destiny 186

Powell J.
ELVIS has left the launch pad 151
Iconic images capture Cape Canaveral origins 380

Richards G.
Satellite Digest 288, 332, 370, 412

Robertson D.F.
Workers grounded without pay 300
Last chance to view a Space Shuttle launch 356

Sanibel M.
Flawed logic of US Space Shuttle 178

Schuminszky N.
Hungry for Space - Simonyi in orbit 26
Politics of the first socialist spacefarers 228

Simpson C.
Mission to test concepts of harvesting solar power 86
SpaceX awaits clearance to launch Falcon 9 129
Bolden carves out commercial future for KSC 132
Space Station Chronology 147
Liftoff for British space agency 167
Boom time for UK space business 325
US space policy under spotlight 378

Spall N.
British ESA astronaut Tim Peake in training 89
British election will set policy course 91
Space biomedicine - a UK perspective 173
Training to the peak of perfection 250
Systems review propels Skylon into spotlight 405

Spiteri G.
Space Station Chronology 182, 224, 257, 295, 340, 383, 417, 463

Stevenson R.
Missles that changed history 267

Stewart M. and A.
How giving up Skylab cost the Earth 434

Quine T.
Women included in new taikonau group 165

van de Haar G. and Simpson C.
Simulated journey to the red planet 172

van de Haar G.
First Air Force spaceplane launches into blackout 209
Launch of new high tech spec military satellite 369
Extending military capabilities 375

Walmsley W.
Growing food in space 388

Zheleznyakov A.
Forgotten space dogs 264

Subject index

A
ABMA 262
ACV 327
AEHF 369
Aero Sekur 286, 388
Afriye, Adam 91
AFSCN 108
Agrospace 388
Aleksandrov 228
Alpha 266
Alpha Magnetic Spectrometer 287
Ammonia hoses 142, 148
AOMC 262
Apollo astronauts 274
Apollo programme 61, 351
Apollo 1 351
Apollo 8 308, 346
Apollo 10 346
Apollo 11 185, 351, 426
Apollo 13 352, 390
Apollo 15 311
Apollo 16 310
Apollo 18 347
Apollo moon landings 100
Apollo-Soyuz 352, 383
Ares 1 51, 94, 133, 250, 303
Ariane 5 87, 247, 369, 411, 447
Arianespace 247, 369, 411
Arktika (Arctic) satellites 413
ARPA 262
Ashley, Robert 215
Asteroids 87, 290, 378, 422
Asteroid 21 Lutetia 334
Asteroid mission 290, 426
Asteroid Sample Return 290, 426
Astronauts
Aldrin, Buzz 350
Anderson, Clay 171, 219, 225
Antonelli, Tony 295, 298, 330
Armstrong, Neil 103, 205, 212, 253, 350
Behnken, Robert 139, 182
Bobko, Karol J 190
Bolden, Charles F 8, 52, 130, 176, 205, 213, 286, 325,338, 374, 378, 406
Bowen, Steven 295, 298, 330
Bresnik, Randy 52, 97
Caldwell Dyson, Tracy 47, 221, 224, 257, 295, 298, 340, 383, 417
Cernan, Gene 212, 253, 350
Chaffee, Roger 351
Chamitoff, Gregory 96
Chilton, Kevin 377
Coleman, Cady 341, 385
Collins, Mike 352
Conrad, Pete 60, 350
Creamer, T J 59, 96, 144, 147, 182, 224, 249, 257, 295, 298, 418

Cunningham, Walt 196, 255
De Winne, Frank 14, 54, 58, 97, 250
Duke, Charles 12
Dutton, Jim 171, 219, 225
Ferguson, Chris 146
Fincke, Michael 224
Foale, Mike 224, 250
Foreman, Michael 55
Fuglesang, Christer 250
Glenn, John 189, 350
Good, Michael 295, 298, 330
Grissom, Gus 351
Haise, Fred 187
Ham, Ken 295, 298, 330
Hilmers, David C 190
Hire, Kathryn 139, 182
Hobaugh, Charles 52
Kuipers, André 89, 250
Laliberte, Guy 58
Lindsey, Steve 458
Lovell, Jim 212, 253, 350, 390
Massimino, Michael 183, 303
Mastracchio, Rick 171, 219, 225
McDivitt, Jim 351
Melvin, Leland 11
Metcalf-Lindenburger, Dorothy 171, 219, 225
Mitchell, Edgar 186
Nespoli, Paolo 89, 250, 341
Noguchi, Soichi 59, 96, 124, 140, 147, 182, 204, 221, 224, 249, 257, 295, 298
Pailes, William D 191
Parazynski, Scott 184
Patrick, Nicholas 139, 182
Payette, Julie 58
Payton, Gary 377
Peake, Timothy 89, 167, 173, 250
Poindexter, Alan 171, 219, 225
Reisman, Garrett 295, 298, 330
Robinson, Stephen 139, 182
Satcher, Robert 55, 385
Schirra, Wally 351
Schmitt, Jack 64
Sellers, Piers 295, 298, 330
Sharman, Helen 74
Shepard, Alan 178, 187, 352
Simonyi, Charles 26
Stafford, Thomas 351
Stewart, Robert L 191
Stott, Nicole 14, 52, 59
Sturckow, Rick 385
Suraev, Max 58, 144, 147, 182, 224
Thirsk, Robert Dr 14, 58, 97
Thomas, Andy 340
Virts, Terry 139, 182
Vittori, Roberto 250
Walheim, Rex 386
Walker, Shannon 47, 219, 340, 383, 417
Wheelock, Douglas 47, 340, 383, 417
White, Ed 351
White, Robert M 276
Whitson, Peggy 224, 386
Wilmore, Barry E 11, 52
Williams, Jeff 14, 54, 58, 96, 143, 147, 182, 224
Williams, Sunita 385
Wilson, Stephanie 171, 219, 225
Wolf, Dave 386
Yamazaki, Naoko 171, 219, 225
Zamka, George 139, 182
Astronaut salary 91
ATK 303
Atlas 413
Atlas-5 367, 375
Atlas-Centaur 178
AT-Space 261
ATV 411, 445
Australia 100
CDSCC 100

B

Baltuck, Miriam Dr 101
Beast of Kandahar 304
Belka 264
Bennett, Steven 88, 206
Bigelow Aerospace 326, 372, 449
Bigelow, Robert 372
BIS library 397
BISE 418
BNSC 45, 167, 406
Boeing 326, 369, 372, 375, 410, 413
Bond, Alan 405
Branson, Sir Richard 46
Bush, George 50, 254, 300, 374, 378

C

Canadarm2 15
Canine cosmonauts 264
Cape Canaveral 380
CarbonSat 410
Carrington, Richard 134
Cassini mission 127
CCSD 262
CEA 388
Chaika 265
Chandrayaan-1 47
Charon satellite 421
Chernushka 266
Chicago 390
China 410
Beidou navigation satellite 367
CZ launcher 171
EO spacecraft 367
Female taikonaut 165
Long March booster 328, 367
Military 367
Yaogan 10 satellite 367
CIA 304
CNES 165, 411
Columbus (laboratory) 16, 59, 147
Comsats 190
Constellation, Project 130, 146, 175, 205, 211, 253, 300, 337, 375
Copernicus, Nicolaus 134
COPUOS 208
Cosmonauts 410
Farkas, Bertalan 26, 228
Gagarin, Yuri 222, 266
Keoktiskov, Konstantin 467
Kisim, Leonid 468
Kondratiev, Dmitri 341
Kornienko, Mikhail 224, 257, 295, 298, 340, 383, 417
Korolev, Sergei 265
Kotov, Oleg 59, 96, 144, 147, 182, 224, 249, 257, 295, 298, 410
Kubasov, Valeriy 231
Lazarev, Vasiliy 265
Lazutkin, Alexei 410
Magyari, Béla 228
Makarov, Oleg 265
Popov, Leonid 208, 231
Popvich, Pavel 466
Prunariu, Dumitru-Dorin 208
Romanenko, Roman 14, 58, 99
Romanenko, Yuri 99
Ryumin, Valeriy 231
Sevastyanov, Vitaly 467
Skvortsov, Alexander 224, 257, 295, 298, 340, 383, 417
Strekalov, Gennady 265
Surayev, Maxim 14, 96, 411
Titov, Vladimir 265
Yurchikhin, Fyodor 340, 383, 417
Zaytsev, Andrey 469
CRAF mission 291
CST-100 326, 413
CST vehicle 374
CubeSat 326
Cupola 124, 139, 149, 182, 257
Cygnus 329

D

Davydov, Vitaly 325
Dawn 294, 423
Delta II 166
Delta 2 Heavy 375
Department of Defence 262
Destiny laboratory 15, 148
DHS/Node 4 367
Di Pippo, Simonetta 173, 445
Doppler 69
Dordain, Jean-Jacques 8, 85, 325, 411
Dovzhenko, Alexander Dr 261
Dragon 47, 255, 285, 371, 408
Drayson, Lord 45, 46, 91, 167, 173, 246
DSN 100, 424
Dutch Space BV 169

E

EADS Astrium 86, 289, 368
EarthKam 16, 226
Earth science 133
Echostar XIV satellite 170
EELV 413
Elbon, John 372
ELVIS 151
Energia 327
EO satellite system 328
Eris 422
ESA 6, 7, 8, 85, 96, 126, 134, 139, 167, 168, 289, 325, 328, 405, 406, 410, 411, 445
astronaut recruitment 89, 250
Council 285
CryoSat-2 207, 331
Envisat 206
Future launcher (FLPP) 447
Giotto 291
Herschel 47, 336
Mars Express 166
Mars mission 369
Rosetta 7, 294, 334
SMOS 9
SWARM 449
ESMO 11
Esposito, Larry 218
EUMETSAT 168
European Commission 88
Europe's weather satellites 168

F

Falcon 9 129, 164, 213, 255, 285, 371, 379, 408
French Guiana 247

G

Gallilei, Galileo 134
Galileo system 87, 88, 406
Gelmini, Mariastella 325
Gemini spacecraft 350
GENSO 126
Geostationary missions 169
German V-2 267
Gerstenmaier, William 340
GIOVE-A 88
Glavkosmos 168
Global Xpress 369
GMES 406
GPS 68, 368
Green, Andy 125, 325
Griffin, Michael 131, 212, 254, 327, 374, 378
GSAT 10 369

H

Hale, George Ellery 134
Hall, Rex 317
Hanks, Tom 352, 391
Harmony/Node 2 14, 367
HLLV 367
Hubble Space Telescope 57, 127, 180, 209, 422
Human space exploration 378
Human spaceflight 285
Hungary 26, 228
Hydra 422
Hylas 411

I

ICC 298
IISL 110
ILS 170
India
Cryogenic third stage 206
GSLV 206
Human spaceflight 126, 206, 448
ISRO 126, 168, 206, 247, 369
Inmarsat 369
Intelsat 17 411
Intercosmos 228
ISS (Space Station) 14, 26, 44, 47, 50, 52, 58, 85, 89, 91, 96, 124, 129, 130, 139, 147, 169, 181, 182, 205, 211, 214, 219, 224, 249, 250, 253, 257, 285, 287, 295, 298, 326, 329, 340, 365, 367, 372, 378, 383, 389, 405, 409, 411, 413, 414, 417, 463
Butterflies 59
Collier Trophy 185
Crew Support LAN 150
HICO/RAIDS/HREP 98
SPHERES 297, 417
Italy 325
Itokawa, Hideo 293
IVGEN 260

J
James Webb Space Telescope 48
Japan
GOSAT 410
Hayabusa spacecraft/mission 290
HTV 15, 53
JAXA 8, 290, 327, 383
Kibo laboratory 15, 147
Suisei/Sakigake 291
Jason 3 165
Johannes Kepler 411
Johnson Space Center 311
JPL 20, 424
Jules Verne 411
JUMPSEAT 106
Jupiter 90, 421

K
Kalamazoo museum 347
Kazakhstan 58, 297
Kennedy, John F 181, 189
Kennedy Space Center 94, 132, 303, 344, 458
Klingons 226
Korea 11
Kuiper Belt Objects 422
Kyoto Protocol 410

L
Laika 264
Lavochkin 327
Leinbach, Mike 142, 303, 344, 458, 460
LEO 175, 413
Leonardo (MPLM) 219, 226, 416
Lisichka 265
Lockheed Martin 153, 175, 211, 218, 245, 304, 337, 366, 367, 369, 374, 410, 413, 426
Lovells of Lake Forest 390
Lowell, Percival 421

M
MAF 337
Mandelson, Lord 167
Mariner II 134
Mars 422, 424
Aurora Mars 406
Craters 20
Curiosity 25
ExoMars 25, 289, 369
Exploration 8, 20, 61, 173, 378
Human mission 61, 173, 205, 388, 426
Life on 289
Mars Direct 255
Mars orbiter 369
MER 20
Meteorites 24
MSL 104
Mars500 172, 246
Mars Lander 25
Odyssey 22
Opportunity 20, 93
Reconnaissance 25, 445
Rovers 289
Sample Return 369, 424
Simulation test 172, 246
Spirit 20, 93
Marshall Spaceflight Center 310, 346
McDonnell Aircraft Corp 349
Mercury 327
Meteorite 290
Meteorology 413
Microgravity 173
Military Shuttle 190
MilStar 369
Mir space station 389, 410
Moon
Exploration 61, 378
Human mission 61, 130, 181, 187, 205, 388
LRO/LCROSS 47
Lunar lander 62, 410
Lunar missions 104
Lunar module 187
Lunar rovers 410
Lunar soil & dust 61
Orion mission 62
Phase B1 study 410
Sample return 247
Water 47
Moore, Sir Patrick 330
Mooshka 266
Mother of Pearl clouds 220
MSG 168
MTG 168
Musk, Elon 129, 213, 285, 371, 408
MUOS satellites 305

N
NASA 6, 8, 18, 50, 87, 90, 93, 139, 151, 205, 211, 214, 249, 250, 253, 262, 285, 287, 289, 295, 298, 303, 309, 326, 367, 372, 375, 378, 407, 409, 411, 414, 424
Budget 130, 175, 430
CCDev 326
CELSS 389
COTS 47, 50, 374, 379, 408
Galileo spacecraft 291
Genesis mission 292
Honeywell Advanced Space Academy for Educators 331
Human spaceflight & robotic exploration 57
Juno spacecraft 90
LCC 344
Lunar test capsule 337
Manned spaceflight 87, 211, 253, 337
Mars mission 369
Monkeys (and PETA) 286
MoonRise 90, 216
NEAR-Shoemaker 291
New Frontiers mission 90, 216
Orbiting Carbon Observatory 410
OSIRIS-REX 90, 216
OSO 134
Rocket-plane 47
SAGE 90, 216, 464
SDO 134
Stardust mission 128, 292
WISE 48
NASM 310
NASRDA 248
NEAR 291
Near Earth asteroids 290, 426
New Mexico Museum of Space History 268, 311
NewSpace 253
Neptune 422
New Horizons 421
Nigeria 248
Nilesat 201 369
Nix 422
Norway 406
NRO 105, 190, 304

O
Obama, Barack 51, 57, 85, 128, 129, 130, 145, 174, 175, 205, 211, 245, 249, 250, 253, 287, 294, 300, 303, 326, 337, 366, 367, 374, 378, 426
OCO satellite 133
OHB 88, 410
OldSpace 253
O'Neill, Gerard K 254
Oort, Jan 423
Orbital Sciences 329
Orbital Space Complex 372
Orion 9, 50, 133, 175, 211, 245, 250, 252, 337, 366, 374, 426, 430
OSP 375
OTV 375

P
Panoramic camera 289
PAN satellite 304
Pantagonian icefield 18
Paradigm 165
Pathfinder 375
Pchelka 266
Perminov, Anatoly 12, 87, 90, 368
Phobos/Phobos Grunt 166, 424
Planck 329
Plasma Crystal-3 Plus Experiment 342
Pleiades satellites 411
Pluto 104, 421
Plutoids 422
Plymouth Rock 426
Poisk/MRM-2 147, 214, 224
Portsmouth Grammar School 330
Powerhouse Museum 347
Prisma satellite 285
Progress 147, 182, 257, 297, 342, 383, 411, 417
Project Gemini 350
Project Mercury 349
Putin, Vladimir 368, 406

Q
Quaoar 422

R
Raman Laser Spectrometer 289
Rascom-QAF1R 369
R & D Engines 347
RD-180 rocket engine 413
Reaction Engines 8, 128, 405
Reusable Booster System 446
Robonaut 2 (R2) 365, 416
Rocketdyne 308, 346
Rockwell 351
Roscosmos 169, 214, 342, 411
RSC Energia 214
Russia 12, 14, 214, 247, 253, 325
Angara rocket 11, 90
Energomash 413
Glonass system 368
Kosmos rocket 210
Manned spaceflight 126
MLM 215
Nuclear spacecraft 90
Rassvet/MRM-1 214, 249, 298, 342
Space tourists 210
Vostochny Space Centre 126
Weather satellite network 413

S
SABRE 405
SAGE (Venus) 454
Sample return 216, 292
Satellite missile tracking tests 329
Saturn 127, 422
Saturn programme 262
Saturn rockets 262
Saturn F-1 engines 308, 346
Science Museum Oklahoma 348
Sci-Fi 392
Sedna 422
Skylab 134, 434
Skylon 8, 128, 256, 404
Slyom Laszlo 26
SOHO 134
Solar System 422
Southwood, David Prof 336
Soviet Space programme 228, 264
Soyuz 87, 89, 96, 147, 182, 205, 213, 219, 224, 228, 247, 253, 296, 327, 340, 383, 411, 416, 417, 463
Soyuz 35 capsule 230
Soyuz-FG 26
Soyuz-ST 411
Soyuz TMA-15 58, 96
Soyuz TMA-17 96
Soyuz TMA-18 463
Soyuz TMA-20 450
Soyuz TMA-01M 465
Soyuz (tourist) 210
Space Adventures 26, 413
Space biomedicine 173
Space exploration 10, 11, 12, 26, 45, 116, 131, 178, 205, 254
Space food production 388
Space law 110
SpaceShipTwo 46
Space Shuttle 50, 178, 190, 205, 298, 303, 352, 356, 375, 379, 411, 416
Atlantis 4, 10, 11, 44, 51, 52, 96, 190, 205, 214, 219, 244, 249, 250, 295, 298, 303, 330, 344, 383, 460
Challenger 179, 191, 254, 352, 460
Columbia 151, 222, 286, 287, 300, 352, 460
Discovery 171, 204, 205, 219, 225, 250, 253, 287, 365, 409, 414, 460
Endeavour 84, 96, 139, 148, 153, 182, 205, 303, 410, 456, 460
Enterprise 178
External tank 456
Observation cameras 151
3D Shuttle displays 344, 460
Space solar power 86
Space tourism 26, 46, 405, 406
SpaceX 47, 127, 129, 164, 213, 285, 371, 372, 379, 408

Spain 406
SPEM 286
Sputnik 178, 264
SRB 303
Sri Lanka 126
SRTM 104
SSPS 8
SSTL 11, 88, 126, 169, 248
Stafford Air & Space Museum 348
Starchaser Industries 88, 206
Starlet 266
Star Trek 226
STEMNET 12
StenniSphere 347
Stern, Alan Dr 422
Strelka 264
STSS 329
Sun 127, 134, 285, 407
  Solar Probe Plus 407
SVET Space Greenhouse 389

T
Tachikawa, JAXA President 219
Taikonauts
  Lingchao, Li 165
  Liwei, Yang 165
  Waping, Yang 165
TASS 265
Taurus 2 329
TDRSS 106
Telecommunications satellite 406
Thales Alenia Space 165, 168
Timation 69
Titan II 350
TNO 423
Tongasat 67
Tranquility/node 3 6, 96, 139, 148, 182, 367
Trujillo, Chad 422
Tsenki 328
Tsiolkovsky, Konstantin 254

U
UAV 304
Udvar-Hazy 310
UFO communications satellite 306
Ugolyok 265
United Kingdom
  ESA facility 91
  Human spaceflight 91, 173, 327, 379
  Innovation Centre 167, 328, 406
  Space development 91, 325
  Space exploration 91, 167, 379
  Space industry 46, 125, 167, 325, 326
  UKSA 45, 91, 167, 173, 246, 251, 285, 289, 325, 326, 328, 405, 406
United Launch Alliance 304
Unity/node 1 6, 367
University of Leicester 127
United States 424
  Air Force 190, 209, 304, 369, 375
  Air Force ground stations 105
  Air Force spaceplane (X-37B) 13
  Congress 338, 366, 367, 372, 379
  Military 246, 268, 369, 446
  Navy 306
  Space exploration 130, 211, 325, 327
  Space policy 378
  Space programme 196, 253, 327, 378
  X-planes 376
Unity node 6
UN Space Committee 208
Uranus 422

V
Van Cise, Ed 223
VEGA 126
Vega 1 & 2 291
Vega booster 127
Venus 134, 454
Veterok 265
Vietnam
  VAST 368
  ENRMS 368
  EO satellite 368
Virgin Galactic 46, 168, 247, 329, 406
Von Braun, Wernher Dr 262, 268
Vostochny space centre 406
Vostok 264
VSS Enterprise 168, 329

W
WhiteKnight 46, 375
Whitesides, George T 247
Willetts, David 246, 289, 325, 326, 327, 328, 330, 378, 405, 406
Williams, David 167, 285, 324, 406
WISE 294
WORF 226
WSPG/WSMR 268

X
X-37 programme 375
X-ray diffractometer 289

Y
Yves Le Gall, Jean 247

Z
Zarya module 6, 58, 340
Zero-g 59, 174
Zhemchughina 266
Zvezda service module 17, 54, 147, 182
Zvezdochka 266

Book reviews

Anderson J. *et al*
The Galaxy Disk in Cosmological Context 33

Aubin D.
The Heavens on Earth 436

Ball A. *et al*
Planetary Landers and Entry Probes 236

Bell J.
Mars 3-D - A Rover's-Eye View of the Red Planet 34

Bely P.-Y. *et al*
A Question and Answer Guide to Astronomy 473

Christopher J.
The Apollo Story 33
The Shuttle Story 237

Cutts S.
Viking Village 236

Dewar J. *et al*
The Nuclear Rocket - Making our Planet Green, Peaceful and Prosperous 35

Dick S.J.
NASA's First 50 Years: Historical Perspectives 472

Dickson P.
A Dictionary of the Space Age 33

Discovery Channel and Demand DVD
Stephen Hawking's Universe 472

French F. *et al*
Into That Silent Sea - Trailblazers of the Space Era, 1961-1965 237

Gallentine J.
Ambassadors From Earth - Pioneering Explorations with Unmanned Spacecraft 34

Gangle T.
The Development of Outer Space - Sovereignty and Property Rights in International Space Law 111

Gordon R.M.
The Space Shuttle Program - How NASA Lost its Way 236

History Channel and Go Entertain
The Universe - Season One 237
The Universe - Season Two 237
The Universe - Season Three 237
The Universe - Season Four 472

Jenkins D.R. *et al*
Servicing the Hubble Space Telescope - Space Shuttle *Atlantis* 2009 237

Jones B.W.
Pluto — Sentinel of the Outer Solar System 436

Kenny P.
The Man Who Supercharged Bond 34

Mackemson H.
Media, NASA and America's Quest for the Moon 472

Manber J.
Selling Peace - Inside the Soviet Conspiracy that Transformed the US Space Program 236

May B. *et al*
BANG! The Complete History of the Universe 34

McDonald A. *et al*
Truth, Lies adn O-Rings - Inside the Space Shuttle Challenger Disaster 35

Morrsion I.
Introductions to Astronomy & Cosmology 237

Musgrave G. *et al*
Safety Design for Space Systems 34

Myrabo L.N. *et al*
Lightcraft Flight Handbook LTI-20 35

Pelton J. *et al*
License to Orbit - The Future of Commercial Space Travel 34

Pillinger C.
My Life on Mars **472**

Prelinger M.
Another Science Fiction — Advertising the Space Race (1957-1962) 436

Rocket Rights Collection, The
Journey to the Edge of the Universe 35

Riley C. *et al*
Apollo 11 - Owner's Workshop Manual 33

Schefter J,
The Race 34

Steven-Boniecki D.
Live TV from the Moon 473

Stooke P.J.
International Atlas of Lunar Exploration 436

Warsitz L.
The First Jet Pilot - The Story of German Test Pilot Erich Warsitz 236

Wiesel W.E.
Spaceflight Dynamics 473